

ABSTRACT OF THE DISCLOSURE

A glow discharge spectroscopy (GDS) source operates at atmospheric pressure. One of the discharge electrodes of the device is formed by an electrolytic solution 27 containing the analyte specimen. The passage of electrical current (either electrons or positive ions) across the solution/gas phase interface causes local heating and the volatilization of the analyte species. Collisions in the discharge region immediately above the surface of the solution results in optical emission and ionization that are characteristic of the analyte elements. As such, these analyte elements can be identified and quantified by optical emission spectroscopy (OES) or mass spectrometry (MS). The device uses the analyte solution as either the cathode or anode. Operating parameters depend on the electrolyte concentration (i.e. solution conductivity) and the gap between the solution surface and the counter electrode. Typical conditions include discharge currents of about 10 to about 60 mA and potentials of about 200 to about 1000 volts. Electrolyte solutions of pH, pNa or pLi values of about 0.5 to about 2 and interelectrode gaps of about 0.5 to about 3 mm produce stable plasmas where the analyte solutions are totally consumed at flow rates of up to about 2.0 mL/min.